

A FAIRY TALE: VAPOR PRESSURE DATA OF THE ELEMENTS

by

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Once upon a time, some four decades ago, Industrial Laboratories LOVED doing RESEARCH, among them RCA LABORATORIES - now defunct, alas! Still, practical results were expected, not tomorrow, but eventually - perhaps ten years down the line. At that time, High-Purity Semiconductor Materials were of great interest, and in this context, I had become interested in their Vaporization Characteristics: Vapor Pressures, Transition Temperatures and Energies, and Clustering. It soon became apparent that most data in this field were quite ancient, dating back to pre-WW II collections, while clustering of the elements of interest had never been observed until we did our mass spectrometric studies in the early fifties.

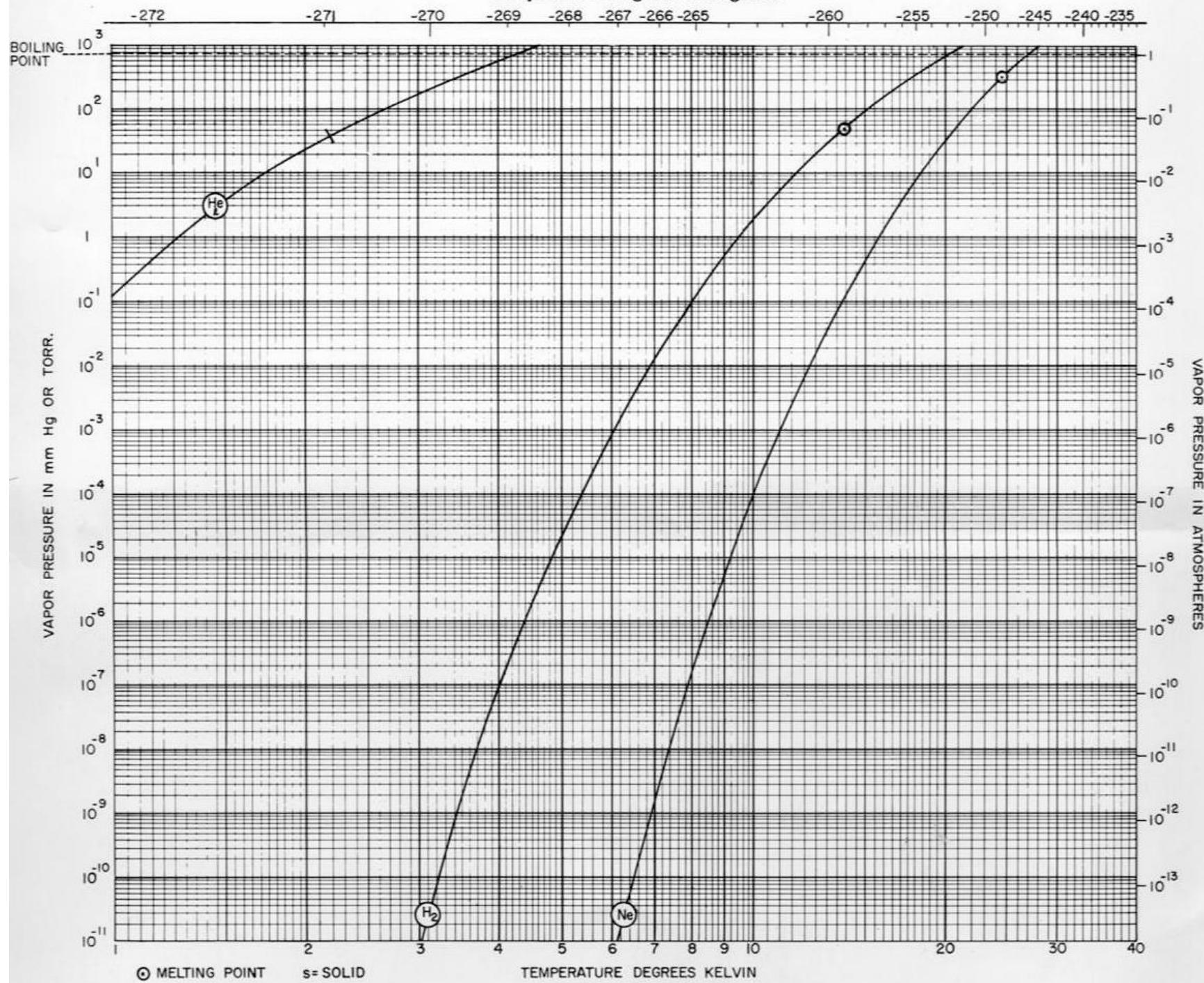
Thus, I decided, in 1957, to take a little time, on the side, to collect and evaluate all recent data available and then present them graphically in the most suitable format. This turned out not to be the classical "log p vs. $1/T$ " presentation which compresses the high-temperature end so much that it is not feasible to show more than a few elements on the same sheet. Instead, I adopted the "log p vs. log T" format which avoids that difficulty. A thorough library search yielded a large volume of recent data that had to be selected, treated with the help of a 1957 vintage computer, and plotted point-by-point on large graph sheets. The special log-log grid used first had to be carefully drawn in by hand, line by line, in our Drafting Room. Vapor pressure data and transition points selected for a total

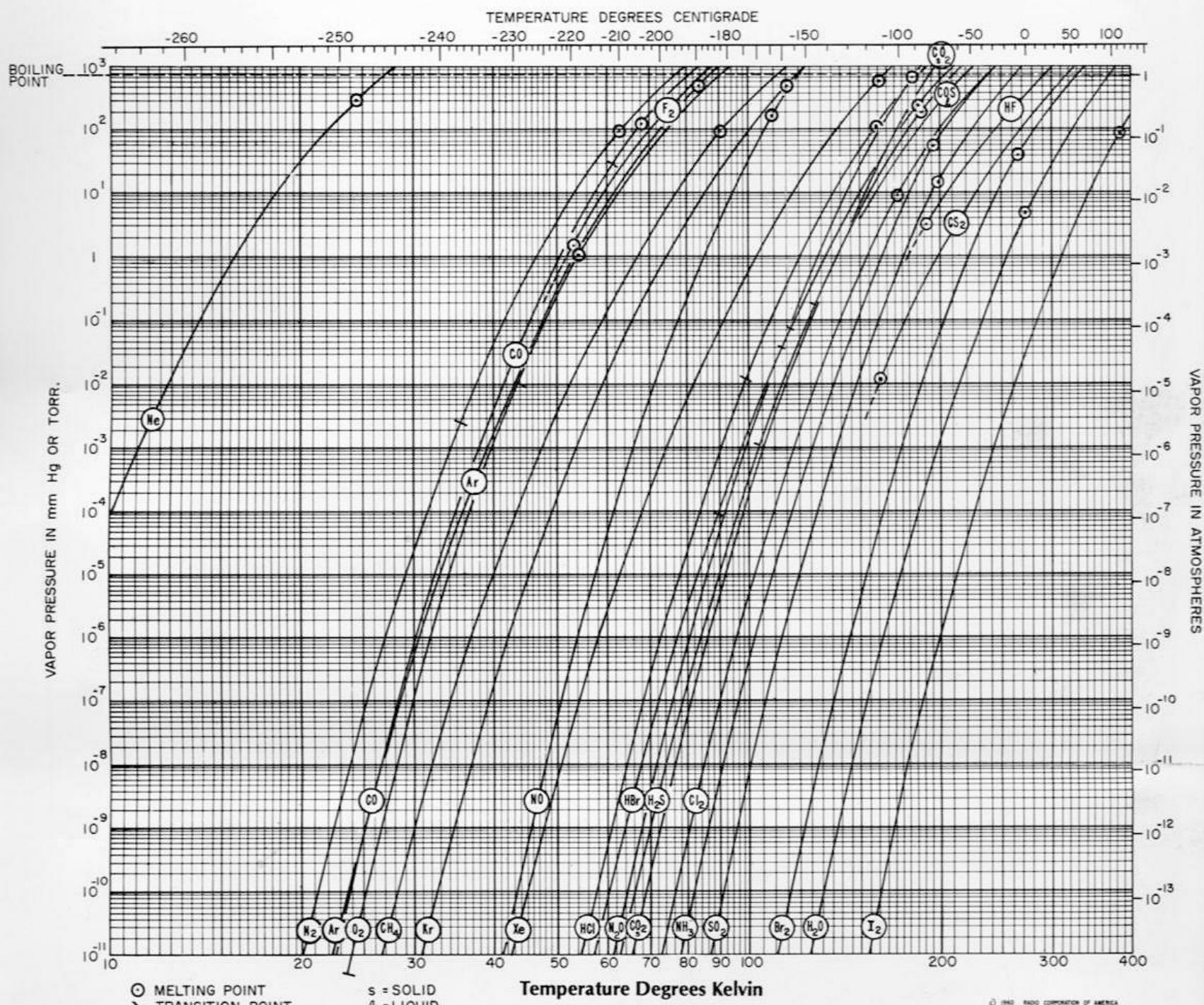
of 57 solid and liquid elements could be accommodated on two large charts in the 1957 edition (1) which became an instantaneous success. Three years later, a similar collection, evaluation, and presentation was made and published by the author and H.O. Hook for the gaseous elements and some of the more common molecular gases (2). Since by 1962 a considerable volume of new information had become available for many additional elements, a second edition covering a total of 79 solid and liquid elements was published (3). Finally, a third edition was undertaken in 1969 by Honig and Kramer to include all the latest, up-to-date information for a total of 81 elements (4). This publication presented the Vapor Pressure Data in tabular and graphical form, as well as Tables of Melting and Vaporization Energies. For about three decades, public interest in this information continued to be very strong, causing RCA Laboratories to distribute many thousands of reprints.

1. R.E. Honig, "Vapor Pressure Data for the More Common Elements," *RCA Review* 18, 195-204 (1957).
2. R.E. Honig and H.O. Hook, "Vapor Pressure Data for Some Common Gases," *RCA Review* 21, 360-368 (1960).
3. R.E. Honig, "Vapor Pressure Data for the Solid and Liquid Elements," *RCA Review* 23, 567-586 (1962).
4. R.E. Honig and D.A. Kramer, "Vapor Pressure Data for the Solid and Liquid Elements" *RCA Review* 30, 285-305 (1969).

VAPOR PRESSURE CURVES OF COMMON GASES

Temperature Degrees Centigrade





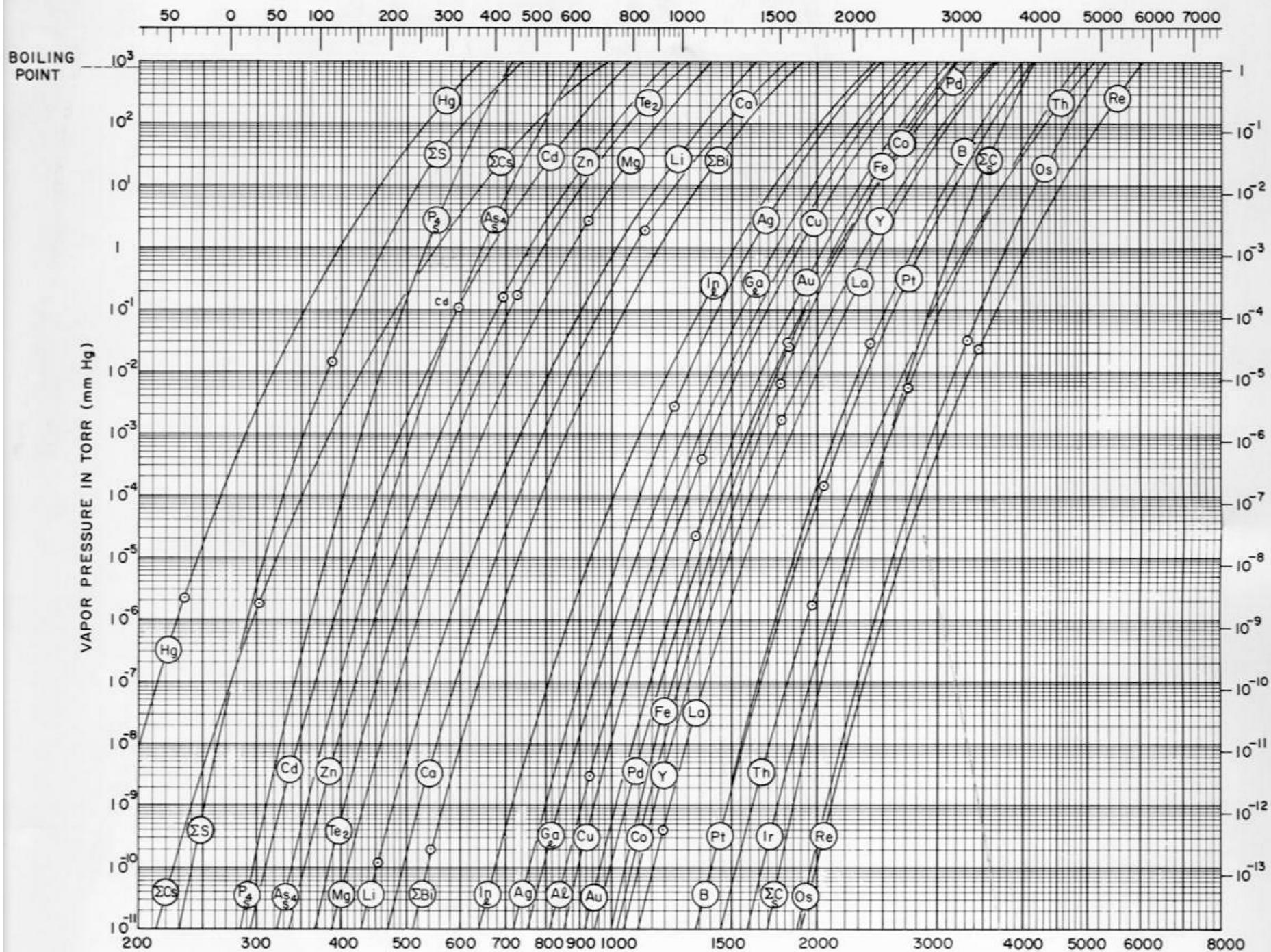
PREPARED BY R.E.HONIG AND H.Q.HOOK

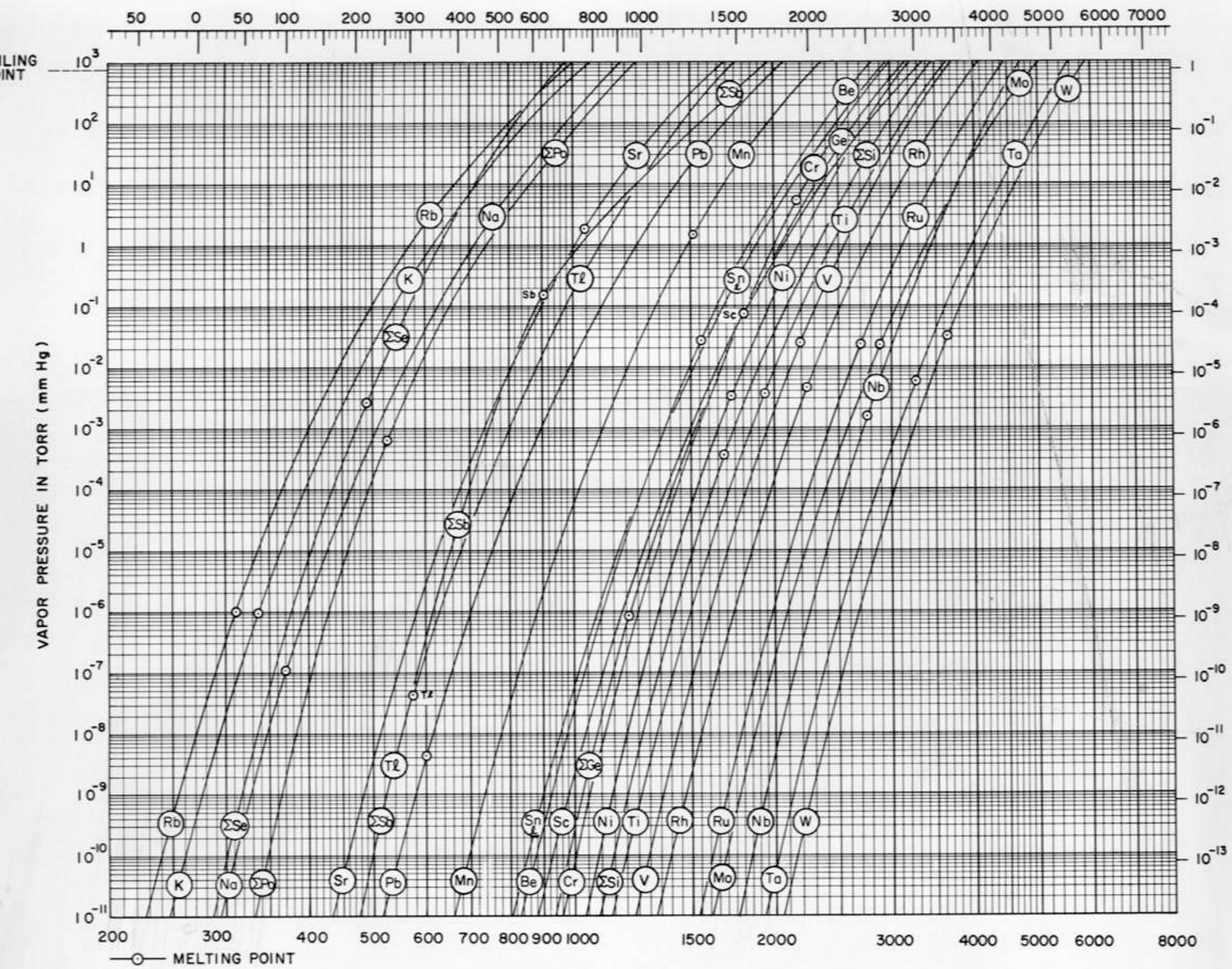
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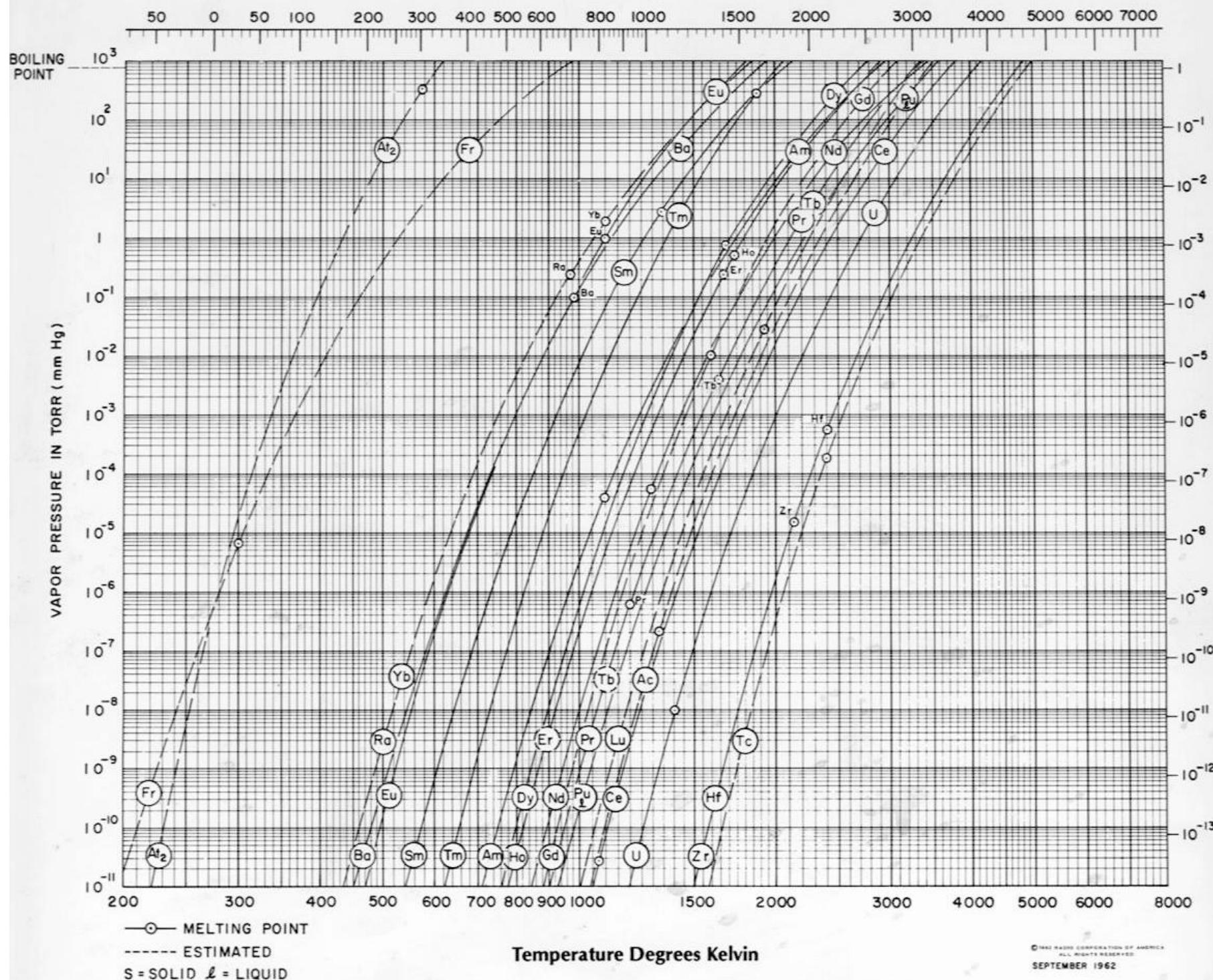
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Temperature Degrees Centigrade







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